

REMARKS/ARGUMENTS

In the Office Action mailed October 16, 2009, claims 1-3 and 5-12 were rejected. In response, Applicant hereby requests reconsideration of the application in view of the amendments and the below-provided remarks. No claims are canceled.

For reference, claims 1-3 and 5-12 are amended. In particular, claim 1 is amended to recite a circuit arrangement of at least one capacitor and at least one inductor. Claim 1 is also amended to recite a group of circuit components of the circuit arrangement implements a transmit filter stage, and a subset of the group of circuit components of the circuit arrangement implements a receive filter stage. Claim 1 is also amended to remove the reference numerals and to improve the formatting of the claim. These amendments are supported, for example, by the subject matter described in the specification at page 4, line 11, through page 5, line 5, and illustrated in Fig. 3. Claims 2, 3, and 5-12 are also amended to remove the reference numerals and to clarify the language of the claims. These amendments are supported by the original language of the claims.

Additionally, claims 13-16 are added to recite further limitations. In particular, claims 13 and 14 recite subject matter related to the transmit filter stage, and claims 15 and 16 recite subject matter related to the receive filter stage. These amendments are supported, for example, by the subject matter described in the specification at page 4, line 11, through page 5, line 5, and illustrated in Fig. 3.

Claim Rejections under 35 U.S.C. 103

Claims 1-3, 5-7, and 10-12 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kodim (U.S. Pat. No. 7,005,940, hereinafter Kodim) in view of Tanaka et al. (U.S. Pat. Pub. No. 2003/0008693, hereinafter Tanaka). Additionally, claim 8 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kodim in view of Tanaka and further in view of Phillips et al. (U.S. Pat. No. 6,765,536, hereinafter Phillips). Additionally, claim 9 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kodim in view of Tanaka and further in view of Fukamachi et al. (U.S. Pat. Pub. No. 2004/0266278, hereinafter Fukamachi). However, Applicant respectfully submits that

these claims are patentable over Kodim, Tanaka, Phillips, and Fukamachi for the reasons provided below.

Independent Claim 1

Claim 1 is patentable over the combination of Kodim and Tanaka because the combination of cited references is improper and does not teach all of the limitations of the claim. Claim 1 recites:

Antenna switch which is arranged to alternately operate in a receive mode and a transmit mode, the antenna switch comprising:

an adaptive filter for coupling a signal processing means to an antenna during the receive mode and for electrically insulating the signal processing means from the antenna during the transmit mode, wherein the adaptive filter comprises a circuit arrangement of at least one capacitor and at least one inductor, wherein:

a group of circuit components of the circuit arrangement implements a transmit filter stage with a first passband during the transmit mode, wherein the first passband is a band-pass passband; and

a subset of the group of circuit components of the circuit arrangement implements a receive filter stage with a second passband during the receive mode.

(Emphasis added.)

Although the Office Action presents articulated reasoning in support of the proposed combination of cited references, the proposed combination of Kodim and Tanaka is improper because the articulated reasoning is not supported by a rational underpinning. Additionally, the combination of Kodim and Tanaka does not teach all of the limitations of the claim.

1. The articulated reasoning presented for the proposed combination of Kodim and Tanaka is not supported by a rational underpinning.

The proposed combination of Kodim and Tanaka is improper because the articulated reasoning presented in the Office Action is not supported by a rational underpinning. In order to establish a *prima facie* rejection of a claim under 35 U.S.C. 103, the Office Action must present a clear articulation of the reason why the claimed

invention would have been obvious. MPEP 2142 (citing *KSR International Co. v. Teleflex Inc.*, 550 U.S. __ (2007)). The analysis must be made explicit. *Id.* Additionally, rejections based on obviousness cannot be sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *Id.*

Thus, there are at least three criteria that must be satisfied in order to establish a *prima facie* case of obviousness:

- 1) The rejection must include a conclusion that the claimed invention would have been obvious.
- 2) The rejection must include articulated reasoning to support the asserted conclusion of obviousness.
- 3) The articulated reasoning must be based on some rational underpinning.

In support of the proposed combination of Kodim and Tanaka, the Office Action states:

Therefore, it would have been obvious to one of ordinary skills [sic] in the art at the time of invention to modify the multiband transformation stage 14 of Kodim to include the features as disclosed by Tanaka et al. One is motivated as such in order to attenuate harmonics generated at the power amplifier.

Office Action, 10/16/09, page 4 (emphasis added).

Although the Office Action concludes that the combination of Kodim and Tanaka would have been obvious, the Office Action does not establish a *prima facie* case of obviousness because the articulated reasoning is not based on a rational underpinning. Specifically, the reasoning presented in the Office Action lacks a rational underpinning because the reasoning presented in the Office Action fails to recognize that Kodim is apparently capable of attenuating harmonics without the additional teachings of Tanaka. In other words, the teachings of Tanaka do not appear to be necessary in order to achieve the stated functionality of attenuating harmonics generated at the power amplifier,

because Kodim already teaches reducing spurious transmitter signals at harmonic frequencies.

Specifically, Kodim teaches using low-pass filters 40, 42 to reduce the level of spurious transmitter signals at harmonic frequencies. Kodim, col. 7, lines 26-27. As shown in Fig. 3a of Kodim, the low-pass filters 40, 42 are included in the high-power stage 12 that is between the transmitters and the antenna 22. In other words, the filters are connected to the transmission inputs.

Tanaka merely teaches similar functionality—using filters at the transmission inputs 6 and 7 to attenuate harmonics generated at the power amplifier sections (not shown) connected to the transmission ports 6 and 7. Tanaka, paragraph 30. In particular, Tanaka teaches using a band-pass or low-pass filter 15A at the GSM signal input 6, and using a bandpass filter 15B at the DCS signal input 7. Id.

Since Kodim is capable of filtering harmonics using the low-pass filters 40, 42 described in Kodim, there is no apparent reason to use the filters of Tanaka in order to perform the same type of harmonic filtering. Thus, it is not rational to state that one skilled in the art might be motivated to use the band-pass filter of Tanaka within the device of Kodim in order to attenuate harmonics, because the device of Kodim already includes low-pass filters to perform such filtering. In other words, the device of Kodim already appears to perform the type of filtering that the reasoning in the Office Action suggests might be achieved with the combined teachings of Kodim and Tanaka. Without providing additional functionality that is not already provided by the device of Kodim, there is no rational basis to suggest changing the device of Kodim to use different filters as described in Tanaka.

For the reasons presented above, the articulated reasoning presented in support of the proposed combination of Kodim and Tanaka is not based on a rational underpinning because the articulated reasoning fails to recognize that the device of Kodim already performs the functionality that is asserted as the basis for the proposed combination. Consequently, the Office Action does not establish a *prima facie* case of obviousness because the articulated reasoning in the Office Action is not based on a rational underpinning. Accordingly, Applicant respectfully asserts the rejection of claim 1 is improper because the Office Action does not establish a *prima facie* case of obviousness.

2. The combination of Kodim and Tanaka does not teach the recited circuit arrangement.

As an additional basis for patentability, the combination of Kodim and Tanaka also fails to teach all of the limitations recited in the claim. In particular, the combination of cited references does not teach the recited adaptive filter with a circuit arrangement that includes at least one capacitor and at least one inductor, in which a group of circuit components implements a transmit filter stage, and a subset of the group of circuit components implements a receive filter stage.

For reference, the reasoning in the Office Action relies on the multiband transformation stage 14 of Kodim as purportedly teaching an adaptive filter. Even if the multiband transformation stage 14 of Kodim were to perform filtering, the multiband transformation stage 14 of Kodim does not include a circuit arrangement with at least one capacitor and at least one inductor. Rather, the multiband transformation stage 14 of Kodim is implemented using transmission lines, based on the principle of impedance matching and wave reflections in transmission line theory. In essence, different lengths of transmission lines cause reflections of signals with corresponding wavelengths, depending on the difference between impedance characteristics at a termination or connection. Since Kodim implements the multiband transformation stage 14 using transmission lines, the multiband transformation stage 14 of Kodim does not include any circuit components such as capacitors or inductors.

Moreover, even if the multiband transformation stage 14 of Kodim were modified by the teachings of Tanaka to include some capacitors and inductors, the resulting combination of teachings nevertheless does not teach using a group of circuit components to implement a transmit filter stage and a subset of the group of circuit components to implement a receive filter stage. In other words, the combined teachings of Kodim and Tanaka do not teach implementing a receive filter stage using a subset of the components that are used to implement a transmit filter stage. Rather, the receiver configuration in Kodim merely consists of the antenna port 22, the transmission lines T1, T2, and the low-power stage 16, because the diodes D1, D2, D3, D4 are all turned off. Similarly, the receiver configuration in Tanaka merely consists of the antenna port 5, the transmission

lines 12a, 12b, some capacitors, and the diplexer 14, because the diodes 11a, 11b, 16 are all turned off. Moreover, even though the diplexer 14 of Tanaka includes circuit components to implement filters, the circuit components of the diplexer 14 are not used in the transmission configuration, so the circuit components of the diplexer 14 are not a subset of circuit components that are used to implement a transmit filter stage. Moreover, since neither Kodim nor Tanaka individually teaches a group of circuit components that are used to implement a transmit filter stage and a subset of those circuit components that are used to implement a receive filter stage, the proposed combination of Kodim and Tanaka fails to teach the recited circuit arrangement.

For the reasons presented above, the combination of Kodim and Tanaka does not teach all of the limitations of the claim because the combination of cited references does not teach a circuit arrangement with a group of circuit components that implement a transmit filter stage and a subset of those circuit components that implement a receive filter stage, as recited in the claim. Accordingly, Applicant respectfully asserts claim 1 is patentable over the combination of Kodim and Tanaka because the combination of cited references does not teach all of the limitations of the claim.

Dependent Claims

Claims 2, 3, and 5-16 depend from and incorporate all of the limitations of independent claim 1. Applicant respectfully asserts claims 2, 3, and 5-16 are allowable based on allowable base claims. Additionally, each of claims 2, 3, and 5-16 may be allowable for further reasons, as described below.

Claim 3

In regard to claim 3, Applicant respectfully submits that claim 3 is patentable over the combination of Kodim and Tanaka because the combination of cited references does not teach all of the limitations of the claim. Claim 3 recites:

Antenna switch according to claim 2, wherein the adaptive filter comprises a high-impedance filter during the transmit mode and a low-impedance filter during the receive mode.

(Emphasis added.)

In contrast, the cited portion of Kodim does not teach high-impedance or low-impedance filters. Rather, Kodim merely describes different effective lengths of transmission lines determined by different locations of ground connections. However, regardless of the effective lengths of the transmission line in the transmit and receive modes, the impedance characteristics of the transmission lines are the same in all of the different modes. Thus, there is no basis for the assertion in the Office Action that the transmit mode and the receive mode described in Kodim might have filtering with different impedance levels. Accordingly, Applicant respectfully asserts that claim 3 is patentable over the combination of Kodim and Tanaka because Kodim does not teach filters with different impedance levels for the transmit and receive modes, as recited in the claim.

Claim 5

In regard to claim 5, Applicant respectfully submits that the rejection of claim 5 is improper because the Office Action does not provide a rational underpinning for the reasoning provided in support of the conclusion of obviousness. For reference, the requirements to establish a *prima facie* case of obviousness are explained above. In regard to the rejection of claim 5, the Office Action merely asserts that it would have been obvious to implement a high-pass filter “in order to keep the operation in the desired frequency bands only and to reduce interference to other users.” Office Action, 10/16/09, pages 4-5. While this assertion may sound reasonable on its face, there is no rational basis for this assertion because the devices of Kodim and Tanaka are both implemented without using any type of high-pass filters. Thus, it is presumed that the operation of each device is already kept within desired frequency bands. Moreover, the reference in the Office Action to reducing interference to other uses is meaningless without some type of additional explanation to explain 1) what type of “interference” might be reduced by using high-pass filters, and 2) who the “other users” might be relative to the devices described in Kodim and Tanaka. Without more contextual information to relate these assertions to the actual descriptions of the cited references, it appears that these assertions in the Office Action are merely speculative generalizations that do not actually pertain to the actual teachings of the cited references. Therefore, in the absence of some stated or

identifiable relationship between these speculative generalizations and the actual teachings of the cited references, the articulated reasoning in the Office Action is not supported by a rational underpinning to establish a *prima facie* case of obviousness. Accordingly, Applicant respectfully asserts the rejection of claim 5 is improper because the Office Action does not establish a *prima facie* case of obviousness.

CONCLUSION

Applicant respectfully requests reconsideration of the claims in view of the amendments and the remarks made herein. A notice of allowance is earnestly solicited.

At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account **50-4019** pursuant to 37 C.F.R. 1.25. Additionally, please charge any fees to Deposit Account **50-4019** under 37 C.F.R. 1.16, 1.17, 1.19, 1.20 and 1.21.

Respectfully submitted,

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